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**EUROPEAN PATENT APPLICATION**

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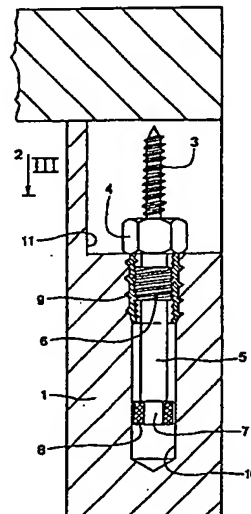
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**A threaded fastener capable of being manipulated in situ at the joint between two members.**

The fastener disclosed comprises: an axial element which consists - working from its foremost point - of a self-tapping section (3), a prismatic intermediate element (4) for manipulating purposes, a threaded collar (6) of identical hand and pitch to that of the self-tapping point, and a shank (5) with an enlarged head (8); the threaded collar (6) pairing with a coaxial threaded sleeve (9) lodged in the mouth of a longitudinal axial hole (10) drilled in the first (1) of two members to be joined, said member provided with a recess (11) to permit of access to said prismatic element, which is then turned so as to drive the self-tapping point into the second member (2) until the axial element is fully home.



A threaded fastener capable of being manipulated in situ at the join between two members.

The invention relates to a threaded fastener which can be manipulated at the point where two members are brought together for joining -that is, a device for tightening together two wooden members such as would make up a piece of furniture, or a staircase, or for fastening together two or more plastic elements, or, more generally speaking, any material whatever including metal, providing that such material is not excessively hard, or at any rate, provided that it will admit entry of a self-tapping thread. The fastener is particularly suitable for applications where joints are to be concealed.

The prior art in this field comprises a fastening device for furniture-assembly having a capstan-head bolt, which pairs with an internally-and externally-threaded sleeve, this being screwed into a hole in one member -a cross member for instance- whilst the head of said bolt is located in a recess cut in the hidden side of the longitudinal member to which the cross member must be butt-joined at right angles. The shank of the bolt passes through a longitudinal hole in the longitudinal member and thence into the threaded sleeve. The fastener thus disclosed is ideal for use in mass production, but is less suited to the assembly of better quality hand-built furniture, where the time required in drilling holes into each of the two members separately -not to mention ensuring their correct alignment- is approximately double that required in drilling a single hole in one member only.

The prior art thus stands in need of further improvement with regard to the necessity for reducing time and labour required in the assembly of hand-built furniture and staircases, and other related products.

From the foregoing, one may discern the need for a solution to the technical problem of realising a threaded fastener for joined wooden and plastic members, and members in other materials generally, which dispenses with the need for drilling one of the two said members whilst guaranteeing

a solid joint, and permitting concealment of the recess where manipulation comes about, when said joint is viewed from the outside.

The invention described herein resolves the problem thus outlined by setting forth an axial element made up of a self-tapping point, a prismatic intermediate element permitting manipulation, a shank incorporating an intermediate threaded collar of identical hand and pitch to the self-tapping point, and an enlarged head whose shoulder abuts with a coaxial sleeve when said self-tapping point is driven home into the second member; said sleeve, which completes the fastener described herein, being threaded internally so as to pair with said intermediate threaded collar, and lodged in the mouth of a longitudinal hole drilled in the first of the two members to be joined, the hole itself departing from a recess in said second member and accommodating the shank and head of the axial element, whilst the recess accommodates its prismatic element and self-tapping point.

The advantage offered by the invention is a saving both in time and in labour costs at small factory and workshop level.

The invention will now be described, by way of example, with the aid of accompanying drawings (3 sheets) in which:

Figure 1 is a longitudinal section through the fastener seen inserted into the first of two members to be joined; Figure 2 is the same section as illustrated in Fig 1, though showing the finished joint;

Figure 3 is a section through III-III in Fig 1;

Figure 4 is the same section as in Fig 1, and shows the application of a capstan for tightening purposes, rather than a spanner;

Figure 5 is the same section as in Fig 2, but showing the application as per Fig 4;

Figure 6 is a section through IV-IV in Fig 4;

Figure 7 is the same section as in Fig 4, showing a variation in the method of fixing the fastener to the first member;

Figure 8 is the same section as in Figure 7, showing a further variation of fixing to said first member;

Figure 9 is a section through IX-IX in Figure 8.

With reference to the drawings, 1 denotes the first member,  
6 and 2 the second member, these being of wood or other relatively soft material, and destined to be joined together. 3 denotes the self-tapping point of the fastener's axial element, and 4 is a prismatic intermediate element which turns as one with said self-tapping point 3 when manipulated with a spanner. 5 denotes the shank of the axial element, coaxial with and departing from said prismatic intermediate element 4. A threaded collar 6 located at an intermediate point on said shank 5 is of identical hand and pitch to the threaded selftapping point 3. 7 denotes the rear end, or  
15 tail of the shank 5, whilst 8 denotes the enlarged head portion proper which butts against a previously-inserted sleeve 9 when the fastener is screwed home tight. Said sleeve 9 must be lodged firmly before manipulating the fastener, and to this end has an external thread of coarser pitch than that of the point 3 and collar 6, this  
20 coarse, external thread being driven into said first member 1. The sleeve's internal thread pairs with said collar 6. 10 denotes an axial hole driller in said member 1 which accommodates the fastener's head 8, shank 5 and sleeve 9, the latter being driven into the mouth of said axial hole.  
25 11 denotes a recess formed in the first member 1 at the point where this abutts with the second member 2, and offering one open side to permit access with a spanner.  
In Figure 4, 12 denotes a recess of circular cross-section, 30 left open at one side just enough to allow protrusion of part of the lateral surface 13 of a capstan 14, this cylindrical in shape and fitted into said recess 12 so as to slide axially with respect to the fastener's prismatic manipulating element 4. The peripheral holes 15 in the  
35 capstan permit insertion of a tommy by means of which to turn capstan and fastener together. In Figure 7, 16 denotes a prismatic extension of the sleeve 9 which remains fast thanks to a recessed portion 17 at one end of the capstan

14, and offers the option of embodying said sleeve 9 with an external thread of opposite hand to that of its internal thread so as to prevent unwarranted loosening once fitted. In fig 8, a circular plate 18 replaces the sleeve 9 and is preferable thereto. Holes 19 pass through the plate and permit insertion of screws 20 which hold the plate 18 itself solidly to the first member 1. A collar 21 incorporated into said circular plate 18 permits of locating the internal axial thread 22 which, occupying the depth of plate- and-collar combined, affords the necessary stability when paired with the thread 6 offered by the fastener's shank 5, as well as ensuring alignment of the latter within the member's axial hole 10. 23 denotes a hole located eccentrically in said circular plate 18; this serving to allow passage of the axial element's head 8, and therefore of greater diameter than that of hole 22 alongside. The fastener as illustrated in figs 1, 2 and 3 functions thus: having drilled the hole in the first member 1 and cut out the recess 11, the sleeve 9 is inserted to a tight fit in the mouth of the hole itself 10; this done, a spanner is applied to the prismatic element 4 and a turning movement imparted. The fastener continues to be turned via its prismatic element 4 until the self-tapping point 3 enters the second member 2, and tightened even to the extent that its collar 6 exits completely from the sleeve 9. The fastener is finally home once the shoulder of its head 8 abutts with the rear of the sleeve 9, and beyond this point, further pressure can be exerted to a degree just sufficient to draw the two members 1 and 2 tight, one against the other, and ensure a solid, well-made butt-join.

When carrying the invention into effect, materials adopted, dimensions, and details of the design may all differ from the foregoing without by any means straying from within the bounds of protection afforded to the concept by appended claims -for instance, the sleeve 9- instead of being threaded externally- might equally well be pressed into its axial hole 10 in the first member 1.

CLAIMS

1. Threaded fastener, capable of being manipulated in situ at the join between two members, and comprising a sleeve with internal and external threads lodged in a hole in the first member (1), this having a recess permitting of access to turn a screw paired with the sleeve's internal thread, and characterised in that it consists of: - an axial element having a self-tapping point (3) which enters the second member (2), a prismatic intermediate element (4) permitting manipulation, a shank (5) incorporating an intermediate threaded collar (6) of identical hand and pitch to said self-tapping point, and an enlarged head (8) whose shoulder butts with a coaxial sleeve (9), the latter internally threaded so as to pair with the threaded offered by said collar (6); said sleeve, which completes the fastener, lodged in the mouth of a longitudinal hole (10) drilled in the first (1) of said two members, which accommodates the shank (5) and head (8) of the fastener's axial element, these being able to slide therein; -said prismatic intermediate element (4) and said self-tapping point (3) being located initially in a rearwards position along the fastener axis, within a recess (11, 12) formed in said first member (1) at the point where this abutts with said second member (2).
2. Fastener as in claim 1 characterised in that it comprises a capstan (14) for manipulating purposes, provided with radial holes (15) and exhibiting a cylindrical outer surface (13), which fits into a cylindrical recess (12) offering a limited opening for said manipulating purposes; said capstan and said prismatic element (4) turning as one within said recess.
3. Fastener as in claim 1 characterised in that said sleeve (9) is externally threaded with left or right hand turns for the purposes of its being driven in said axial hole (10), and to that end, provided with a prismatic extension (16) free to turn independently of said capstan (14) by virtue of a recessed portion (17) at the end of the latter nearest thereto.

4. Fastener as in claim 1 characterised in that the threaded collar (6) thereof pairs with the internal thread cut into an element consisting of a circular plate (18) and associated collar (21) permitting alignment with the mouth of said axial hole (10); said plate provided with holes (19) which permit fixing thereof to the recess surface farthest from the butt-join with said second member (2), and with an eccentrically located hole (23) for insertion of the rear end of said shank (5).

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Fig.1

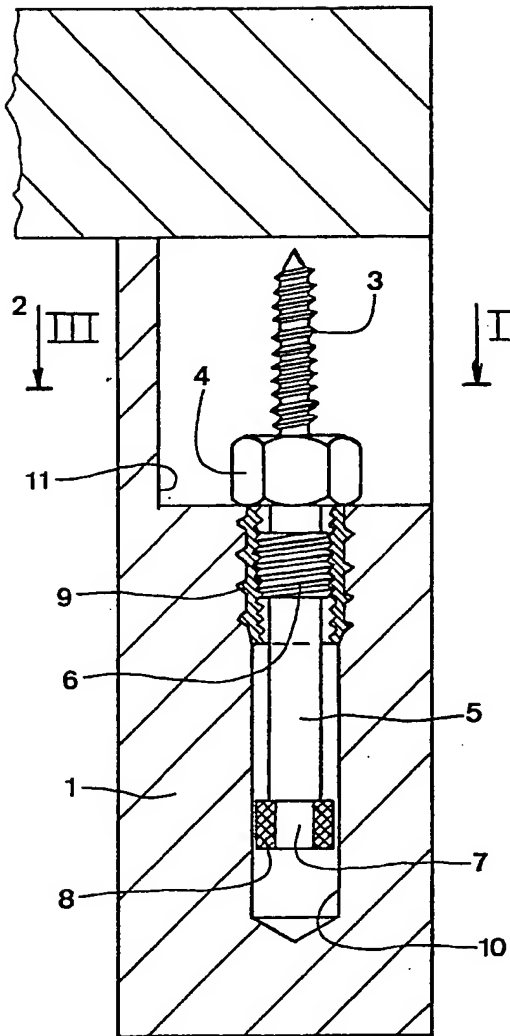


Fig.2

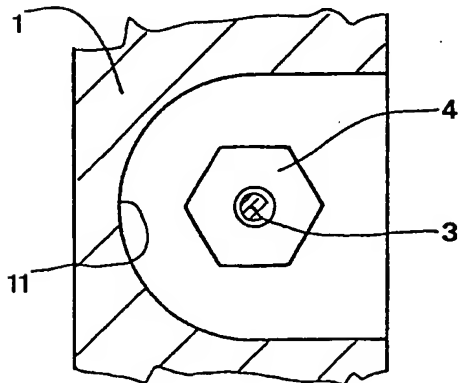
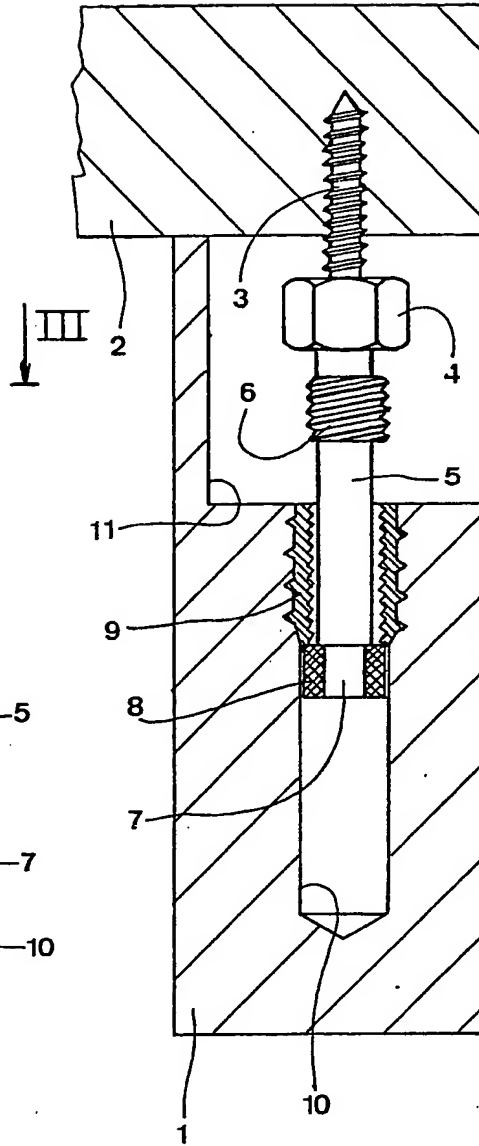
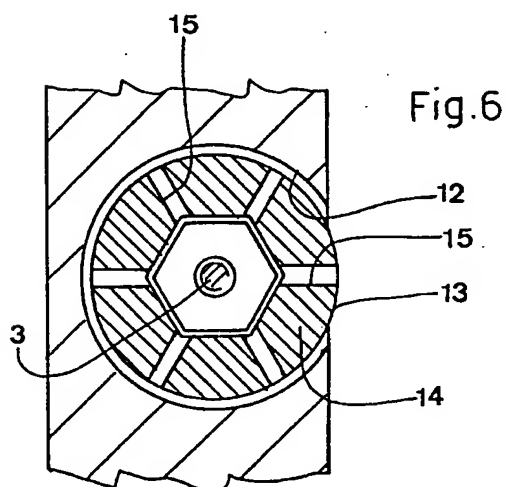
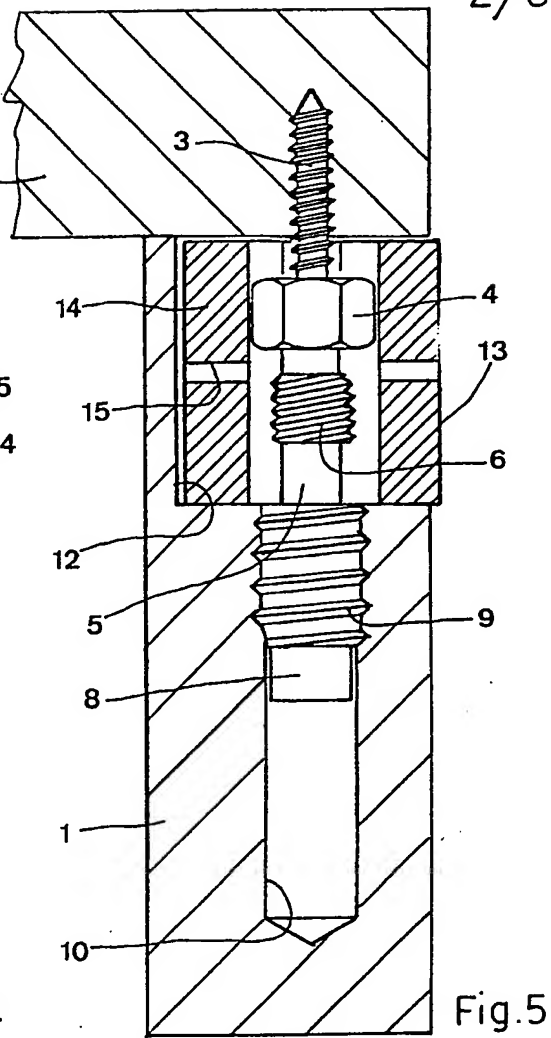
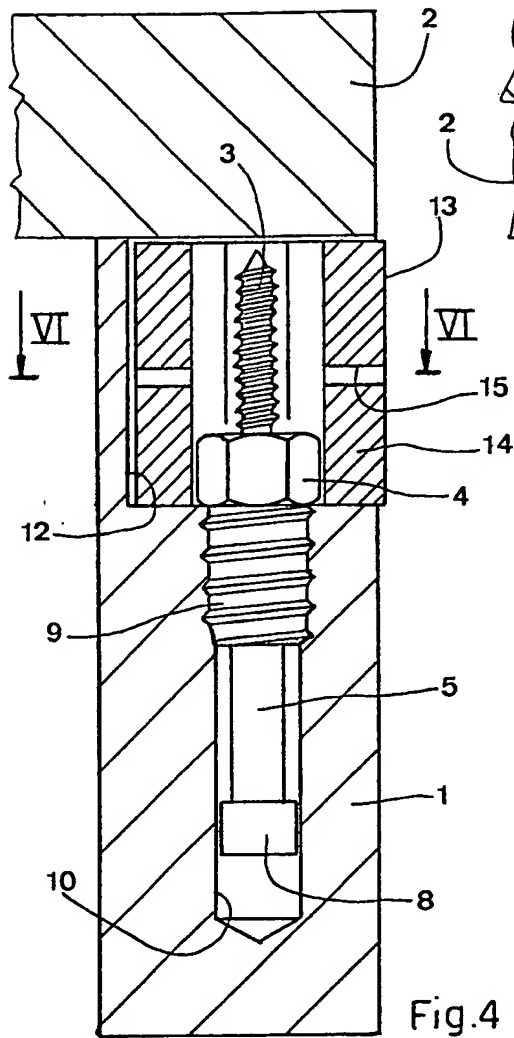


Fig.3







European Patent  
Office

# EUROPEAN SEARCH REPORT

0124054

Application number

DOCUMENTS CONSIDERED TO BE RELEVANT			EP 84104519.8
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 7)
A	DE - A1 - 2 925 526 (ILLINOIS TOOL WORKS INC.) * Claim 1; fig. 1,3 * --	1	F 16 B 35/00 F 16 B 12/16 F 16 B 25/00 F 16 B 5/02
A	DE - A1 - 2 549 342 (KLÖCKNER-HUMBOLT-DEUTZ AG) * Claim 1; fig. 1,3 * --	1	
A	US - A - 2 485 280 (JOHN F. GRACE) * Claims 1,5; fig. 3,8 * ----	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl. 7)
			F 16 B
The present search report has been drawn up for all claims			
Place of search VIENNA		Date of completion of the search 25-07-1984	Examiner REIF
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	